AMENDMENT

Please amend the claims as follows:

1. (currently amended) An ultrasound probe for connection with an imaging system, the probe comprising:

an ultrasound transducer;

a releasable connector electrically connected with the ultrasound transducer and releasably connectable with an ultrasound imaging system, the releasable connector having a plurality of electrical outputs for respective signals each representing one or more different elements; and

an analog-to-digital converter connected between the ultrasound transducer and the releasable connector and separate from an imaging system and an imaging system housing.

2. (original) The probe of Claim 1 wherein the ultrasound transducer comprises a multi-dimensional array of elements.

3. (original) The probe of Claim 1 further comprising:

a cable electrically connecting the ultrasound transducer to the analog-to-digital converter; and

a housing connected with an end of the cable and at least partially around the releasable connector and the analog-to-digital converter, the housing spaced from the ultrasound transducer.

4. (original) The probe of Claim 1 wherein the transducer array comprises a plurality of transducer elements, the analog-to-digital converter electrically connected with at least a first element of the plurality of transducer elements;

further comprising a plurality of analog-to-digital converters, the plurality of analog-to-digital converters including the analog-to-digital converter electrically connected with the first element, the plurality of analog-to-digital converters electrically connected with different ones of the plurality of transducer elements.

5. (original) The probe of Claim 4 further comprising:

a plurality of cables electrically connecting the plurality of transducer elements to the respectively plurality of analog-to-digital converters, the plurality of cables being fewer than the plurality of transducer elements; and

a multiplexer electrically connected between the plurality of cables and the plurality of transducer elements.

6. (original) The probe of Claim 1 further comprising:

a summer connected with the analog-to-digital converter, the summer operable to combine signals from at least two elements of the transducer array, the combined signal output on one of the plurality of electrical outputs as a signal representing one of the different elements.

7. (original) The probe of Claim 1 further comprising a partial beamformer operable to combine data from elements of the transducer array and output the combined data on respective ones of the plurality of electrical outputs.

8. (original) The probe of Claim 1 further comprising:

a digital processor connected between the analog-to-digital converter and one of the plurality of electrical outputs.

9. (original) The probe of Claim 1 further comprising:

a switch connected between the transducer array and the analog-to-digital converter, the switch operable to bypass analog signals to one of the plurality of electrical outputs.

10. (original) The probe of Claim 1 further comprising:

a demultiplexer connected with the analog-to-digital converter; and

a serializer connected with the demultiplexer and at least one of the plurality of electrical outputs.

11. (original) A system for communicating signals from a transducer for imaging, the system comprising:

a processing system comprising:

at least a part of a receive beamformer;

a system housing; and

a connector on the system housing, the connector electrically connectable with the receive beamformer; and

a detachable transducer assembly comprising:

a transducer probe at least partially housing an array of elements;

a connector housing at least partially housing an analog-to-digital converter, the connector housing physically connectable and detachable from the connector on the system housing; and

at least one cable connecting the transducer probe with the connector housing.

12. (original) The system of Claim 11 wherein the transducer probe is a handheld probe.

13. (original) The system of Claim 11 wherein:

the transducer probe further houses a multiplexer connected with a plurality of the elements of the array, the multiplexer operable to multiplex signals from the plurality of elements to an output; and

the connector housing further housing a demultiplexer.

14. (original) The system of Claim 11 wherein the connector housing further houses a serializer connected with the analog-to-digital converter.

15. (original) The system of Claim 11 wherein the connector housing further houses a processor, the processor operable to compress digital data responsive to output by the analog-to-digital converter.

16. (original) An ultrasound probe for connection with an imaging system, the probe comprising:

an ultrasound transducer;

a releasable connector electrically connected with the ultrasound transducer and releasably connectable with an ultrasound imaging system, the releasable connector having a plurality of electrical outputs for respective signals representing different elements; and

a processor connected between the ultrasound transducer and the releasable connector, the processor in a housing of the releasable connector and operable to compress signals from the ultrasound transducer.

17. (original) The probe of Claim 16 further comprising an analog-to-digital converter between the transducer and the processor, the processor comprising a digital processor.

18. (original) The probe of Claim 16 further comprising a cable between the housing and the ultrasound transducer.

19. (original) The probe of Claim 16 wherein the processor is operable to compress signals by partial beamforming.

20. (original) A method for communicating signals from a transducer array to an imaging system, the method comprising:

(a) releasably connecting a probe assembly to an imaging system;

(b) transducing acoustic energy into electrical signals;

(c) transmitting the electrical signals to an analog-to-digital converter;

(d) converting the electrical signals into digital data within the probe assembly; and

(e) passing the digital data from the probe assembly to at least a part of a beamformer of the imaging system.

21. (original) The method of Claim 20 wherein (c) comprises transmitting the electrical signals through a cable of the probe assembly, and wherein (d) comprises converting the electrical signals into digital data within a connector housing of the probe assembly.

22. (original) The method of Claim 20 further comprising:

(f) compressing the digital data prior to (e).

23. (original) The method of Claim 20 further comprising:

(f) time division multiplexing the electrical signals prior to (c); and

(g) demultiplexing the digital data after (d) and before (e).

24. (original) The probe of Claim 3 wherein transducer cables within the cable each have a constant length and same impedance.